

**Amendments**

In the Claims:

What is claimed is:

[c1] (Canceled)

[c2] (Canceled)

[c3] (Canceled)

[c4] (Currently Amended) ~~The system of claim 1, where the plurality of pneumatic feed rings comprise four pneumatic feed rings that are located in the interior of the plasma generator~~ A plasma generation system, comprising:

a plasma generator;

a feed system comprising four pneumatic feed rings located in the interior of the plasma generator, where the pneumatic feed rings supply plasma-forming gas to the plasma generator; and

an alternating current power source that powers the plasma generator.

[c5] (Canceled)

[c6] (Canceled)

[c7] (Canceled)

[c8] (Currently Amended) ~~The system of claim 7, where the number of phases of the transformer is equal to the number of electrodes~~ A plasma generation system, comprising:

a plasma generator comprising a plurality of electrodes that generate an arc to heat the plasma-forming gas within the interior of the plasma generator;

a feed system comprising a plurality pneumatic feed rings located in the interior of the plasma generator, where the pneumatic feed rings supply plasma-forming gas to the plasma generator; and

an alternating current power source that powers the plasma generator, comprising a multi-phase transformer that connects each electrode to a conventional alternating current utility network, where the number of phases of the transformer is equal to the number of electrodes.

- [c9] (Currently Amended) The system of claim 7 8, where the multi-phase transformer is arranged in a wye configuration.
- [c10] (Currently Amended) The system of claim 7 8, where the multi-phase transformer is arranged in a wye-double zigzag configuration.
- [c11] (Currently Amended) The system of claim 7 8, where the multi-phase transformer is arranged in a wye-polygon configuration.
- [c12] (Currently Amended) The system of claim 7 8, where the multi-phase transformer has three phases.
- [c13] (Currently Amended) The system claim of claim 7 8, where the multi-phase transformer has six phases.
- [c14] (Canceled)
- [c15] (Currently Amended) The system of claim 1 8, where the alternating current power source is connected to the plasma generator through at least one separation filter.
- [c16] (Canceled)
- [c17] (New) A multiphase alternating current plasma generator, comprising:
  - an electrode unit comprising fixed electrodes, plasma injector that

introduces an ionized stream into area of minimum convergence between the fixed electrodes, and a nozzle unit joint, wherein the electrode unit is joined with the nozzle unit to form a united electric discharge chamber;

a multiphase transformer that is connected to a common low-voltage alternating current network, wherein each fixed electrode is fed from the multiphase transformer;

a plurality of pneumatic feed rings that feed a plasma-forming gas from an external source into the electric discharge chamber, wherein the pneumatic feed rings comprise radial holes tangentially located along the walls of the electric discharge chamber so as to provide a boundary layer of plasma-forming gas along the chamber walls wherein the temperature of the boundary layer is significantly lower than in the main plasma-forming gas stream along the chamber length; and

a controller with monitoring circuits that ensures operation of the plasma generator include an emergency cut-off operation.

[c18] (New) The generator of claim 17, further comprising:

a nozzle unit of cylindrical shape that allows changing the length and the diameter of the electric discharge chamber, the outlet temperature of the electric discharge chamber, and plasma-forming gas flowrate through of the electric discharge chamber.

[c19] (New) The generator of claim 17, wherein the multiphase transformer provides a supply voltage of control 220 V and power voltage between 400 V - 4000 V , where the power voltage allows step increases in voltage that allows sharply increase the plasma generator power at the same current.

[c20] (New) The generator of claim 17, wherein the plasma injector comprises a single-phase AC plasma 4-10 kW generator and a special profiled nozzle that is joined to the electrode unit of the plasma generator, wherein the

special profiled nozzle creates concentration of electrons  $n_e \sim (10^{13}-10^{14}) \text{ cm}^{-3}$  in the electric discharge chamber volume that reduces wear of electrodes to less than  $10^{-6} \text{ g/C}$ .

- [c21] (New) The generator of claim 17, wherein includes the plasma injector includes a high frequency power source with supply voltage frequency between 1-10 kHz, where the injector simultaneously supplies an ionized jet of plasma-forming gas into the gap between power electrodes and simultaneously switches the poles of the injector power source to each power electrode.
- [c22] (New) The generator of claim 17, wherein the multiphase transformer includes an amount of secondary windings equal to the amount of electrodes and a capacity condenser that allows the generator to achieve a power factor close to 1.
- [c23] (New) The generator of claim 17, further comprising current limiting reactors with a variable inductance for regulating the current from the multiphase transformer.
- [c24] (New) The generator of claim 23, further comprising a cooling system for current limiting reactors, where the cooling system comprises a flowmeter, a plurality of thermocouples, and flow transducer of water.
- [c25] (New) The generator of claim 17, wherein the plurality of pneumatic feed rings are tangentially placed uniformly along the electric discharge chamber length with radial holes to create a diffuse turbulent discharge of plasma-forming gas that forms a boundary layer along the walls with the significantly lower temperature than in the main gas stream.
- [c26] (New) The generator of claim 17, wherein the fixed electrodes installed in the electric discharge chamber have variable cross-section area that is 2.8

times larger on the end of the electrode than at the beginning of the electrode.

- [c27] (New) The generator of claim 17, wherein the fixed electrodes have a declination to the axes of the plasma generator from 0-60 degrees, where the declination is dependent on the plasma generator power and flowrate of the plasma-forming gas.
- [c28] (New) The generator of claim 17, further comprising an electric drive that regulates and maintains of the inter-electrode gap to allow adjustment of the generator.